ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ದಾವಣಗೆರೆ

DAVANGERE UNIVERSITY, DAVANGERE

BACHELOR OF COMPUTER SCIENCE

National Education Policy - 2020 (NEP-2020)

Syllabus for Bachelor of Computer Application (B.C.A)

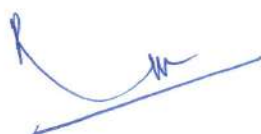(III & IV Semester)

ಗಣಕ ವಿಜ್ಞಾನ ಅಧ್ಯಯನ ವಿಭಾಗ

DEPARTMENT OF STUDIES IN COMPUTER SCIENCE

BOS Chairman
Dept of Computer Science
Davangere University
Shivagangour, Davangere

Curriculum Structure for BCA

SEMESTER-3

Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
DSC7	21BCA3C7L	Database Management System	40	60	100	3	0	0	3	2
	21BCA3C7P	DBMS Lab	25	25	50	0	0	4	2	3
DSC8	21BCA3C8L	C# and Dot Net Framework	40	60	100	3	0	0	3	2
	21BCA3C8P	C# and Dot Net Framework Lab	25	25	50	0	0	4	2	3
DSC9	21BCA3C9L	Computer Communication and Networks	40	60	100	3	0	0	3	2
OEC3	21BCA3O3RPL	Electronic Commerce	40	60	100	3	0	0	3	2
SEC2	21BCA3SE2AI	Open Source Tools	20	30	50	1	0	2	2	1

SEMESTER-4

Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
DSC10	21BCA4C10L	Python Programming	40	60	100	3	0	0	3	2
	21BCA4C10P	Python Programming Lab	25	25	50	0	0	4	2	3
DSC11	21BCA4C11L	Computer Multimedia & Animation	40	60	100	3	0	0	3	2
	21BCA4C11P	Multimedia & Animation Lab	25	25	50	0	0	4	2	3
DSC12	21BCA4C12L	Operating System Concepts	40	60	100	3	0	0	3	2
OEC4	21BCA4O4ECL	Python Programming Concepts	40	60	100	3	0	0	3	2

Course Content for BCA, Semesters III

Course Title: Database Management System	Course code: 21BCA3C7L
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (CO's):

At the end of the course, students will be able to:

- Explain the various database concepts and the need for database systems.
- Identify and define database objects, enforce integrity constraints on a database using DBMS.
- Demonstrate a Data model and Schemas in RDBMS.
- Identify entities and relationships and draw ER diagram for a given real-world problem.
- Convert an ER diagram to a database schema and deduce it to the desired normal form.
- Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation.
- Explain the transaction processing and concurrency control techniques.

DSC7: Database Management System (DBMS)

Unit	Description	Hours
1	**Database Architecture:** Introduction to Database system applications. Characteristics. People associated with Database system. Data models. Database schema. Database architecture. Data independence. Database languages and classification of DBMS. **E-R Model:** Entity-Relationship modeling: E – R Model Concepts: Entity. Entity types, Entity sets, Attributes. Types of attributes, key attribute, and domain of an attribute. Relationships between the entities. Relationship types, roles and structural constraints, degree and cardinality ratio of a relationship. Weak entity types, E –R diagram. **Relational Data Model:** Relational model concepts. Characteristics of Relations. Relational model constraints: Domain constrains, key constraints. Primary & foreign key constraints, integrity constraints and null values.	14

2	**Relational Algebra:** Basic Relational Algebra operations. Set theoretical operations on relations. JOIN operations Aggregate Functions and Grouping. Nested Sub Queries-Views. Introduction to SQL and PL/SQL & programming of above operations in PL/SQL. **Data Normalization:** Anomalies in relational database design. Functional dependencies. **Normalization.** First normal form, Second normal form, Third normal form. Boyce-Codd normal form.		14
3	**Query Processing Transaction Management:** Introduction Transaction Processing. Single user & multiuser systems. Transactions: read & write operations. **Need of concurrency control:** The lost update problem. Types of failures. Transaction states. Desirable properties (ACID properties) of Transactions. Concurrency Control Techniques: Locks and Time stamp Ordering.		14

References:

1. Ramez Elamassri, Shankant B. Navathe, Fundamentals of Database Systems, Pearson, 7th Edition, 2015
2. Bipin Desai, An Introduction to database systems, GalgotiaPublications,2010.
3. C J Date: Introduction to Database System
4. Abraham Silberschatz, Henry Korth, S.Sudarshan, Database Systems Concepts, Sixth Edition, McGraw Hill,2010.
5. Raghu Rama krishnan and Johannes Gehrke, Database management systems, Third Edition, 2002

Course Title: C# and Dot Net Framework	Course code: 21BCA3C8L
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (CO's):

At the end of the course, students will be able to:

- Describe Object Oriented Programming concepts like Inheritance and Polymorphism in C# programming language.
- Interpret and Develop Interfaces for real-time applications.
- Build custom collections and generics in C#.

DSC8: C# and Dot Net Framework

Unit	Description	Hours
1	**Introduction to .Net Technologies:** Introduction to Web Technologies, HTML Basics, Scripts, Sample Programs. Advantages and Disadvantages of Client-side and Server-side Scripts. **Introduction to C#:** Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Control Structures-Methods, Arrays, Strings, Structures, Enumerations. **OOPS with C#:** Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading Delegates, Events, Errors and Exceptions, Multithreading	14
2	**Application Development on Dot NET:** C#.NET: Building Windows Applications, VB.NET: Windows Forms. Working with Controls, Timer, Picture-box, Group-box, Combo-box, Horizontal and Vertical Scrollbar, Numeric-up-down and Progress-bar. Functions in C#.NET. Database applications	14
3	**ADO .NET CONNECTIVITY:** Introduction to ADO.NET, ADO vs ADO.NET. Architecture: Data reader, Data adopter, Accessing Data with ADO.NET. Programming Web Applications with Web Forms. ASP.NET applications with ADO.NET	14

References:
1. "Programming in C#", E. Balagurusamy, 4th Edition, Tata McGraw-Hill,2017.
2. "Visual Basic.NET", Shirish Chavan, 3rd Edition, Pearson Education,2009.
3. "ASP.NET and VB.NET Web Programming", Matt J. Crouch, Edition2012.
4. "Computing with C# and the .NET Framework", Arthur Gittleman, 2nd Edition, Jones & Bartlett Publishers,2011

Course Title: Computer Communication and Networks	Course code: 21BCA3C9L
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (CO's):

At the end of the course, students will be able to:

- Explain the transmission technique of digital data between two or more computers and a computer network that allows computers to exchange data.
- Apply the basics of data communication and various types of computer networks in real world applications.
- Compare the different layers of protocols.
- Compare the key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI.

DSC9: Computer Communication and Networks

Unit	Description	Hours
1	**Introduction:** Computer Networks and its applications, Network structure, network architecture, Topologies, LAN, WAN, MAN, The OSI reference model, The TCP/IP reference model. **The Physical Layer:** Transmission Media – Twisted pair, coaxial cable, optical fiber, radio transmission, microwaves and infrared transmission, Switching – message switching, Multiplexing. **The Data Link Layer:** Data Link Layer design issues, Error detection – Single parity checking.	14
2	**Data Link Layer (continue..):** Checksum, Polynomial codes – CRC, Error correction- Hamming code, Elementary data link protocols, sliding window protocols. **The Network Layer:** Network layer design issues, Routing algorithms – Flooding, shortest path routing, optimality principles routing,	14
3	**Network Layer (continue..):** Link state routing, Congestion control algorithms – Leaky bucket, token bucket algorithm. **The Transport Layer and Application Layer:** Elements of Transport service, Elements of Transport protocols, Internet transport protocols (TCP & UDP), DNS, Electronic Mailing, and World Wide Web.	14

References:

1. Computer Networks, Andrew S. Tanenbaum, 5th Edition, Pearson Education, 2010.
2. Data Communication & Networking, Behrouza A Forouzan, 3rd Edition, Tata McGraw Hill,2001
3. Data and Computer Communications, William Stallings, 10th Edition, Pearson Education 2017.
4. Data Communication and Computer Networks, Brijendra Singh, 3rd Edition, PHI, 2012.
5. Data Communication & Network, Dr. Prasad. Wiley Dreamtech.
6. http://highered.mheducation.com/sites/0072967757/index.htmls

Year	II	Course Code: 21BCA3C7P		Credits	02
Sem.	III	Course Title: Lab: DBMS		Hours	52
Formative Assessment Marks: 25		Summative Assessment Marks: 25		Duration of ESA: 03 hrs.	
Practical's		CO: Student would be able to create tables, execute queries and PL/SQL programs.			

Part A

1. Create a table called Employee with the following structure.

Name	Type
Empno	Number
Ename	Varchar2(20)
Job	Varchar2(20)
Mgr	Number
Salary	Number

   a. Add a column commission with domain to the Employee table.
   b. Insert any five records into the table.
   c. Update the column details of job
   d. Rename the column of Employ table using alter command.
   e. Delete the employee whose empno is19.

2. Create department table with the following structure.

Name	Type
Deptno	Number
Deptname	Varchar2(20)
location	Varchar2(20)

   a. Add column designation to the department table.
   b. Insert values into the table.
   c. List the records of emp table grouped by deptno.
   d. Update the record where deptno is9.
   e. Delete any column data from the table.

3. Create a table called Customer table

Name	Type
Cust. name	Varchar2(20)
Cust. street	Varchar2(20)
Cust. city	Varchar2(20)

   a. Insert records into the table.
   b. Add salary column to the table.
   c. Alter the table column domain.
   d. Drop salary column of the customer table.
   e. Delete the rows of customer table whose cust_cityis'CTA'

4. Create a table called branch table.

Name	Type
Branch name	Varchar2(20)
Branch city	varchar2(20)
Asserts	Number

  a. Increase the size of data type for asserts to the branch.
  b. Add and drop a column to the branch table.
  c. Insert values to the table.
  d. Update the branch name column
  e. Delete any two columns from the table
  f. Delete the row of the table with some condition.

QUERIES USING DDL AND DML

5. a. Create a user and grant all permissions to the user.
   b. Insert the any three records in the employee table and use rollback. Check the result.
   c. Add primary key constraint and not null constraint to the employee table.
   d. Insert null values to the employee table and verify the result.

6. a. Create a user and grant all permissions to the user.
   b. Insert values in the department table and use commit.
   c. Add constraints like unique and not null to the department table.
   d. Insert repeated values and null values into the table.

7. a. Create a user and grant all permissions to the user.
   b. Insert values into the table and use commit.
   c. Delete any three records in the department table and use rollback.
   d. Add constraint primary key and foreign key to the table.

QUERIES USING AGGREGATE FUNCTIONS

8. a. By using the group by clause, display the enames who belongs to deptno 10 along with average salary.
   b. Display lowest paid employee details under each department.
   c. Display number of employees working in each department and their department number.
   d. Using built in functions, display number of employees working in each department and their department name from dept table. Insert deptname to dept table and insert deptname for each row, do the required thing specified above.
   e. List all employees which start with either B or C.
   f. Display only these ename of employees where the maximum salary is greater than or equal to 5000.

9. a. Calculate the average salary for each different job.
   b. Show the average salary of each job excluding manager.
   c. Show the average salary for all departments employing more than three people.
   d. Display employees who earn more than the lowest salary in department30
   e. Show that value returned by sign (n)function.
   f. How many days between day of birth to current date.
10. a. Show that two substring as single string.

b. List all employee names, salary and 15% rise in salary.

c. Display lowest paid emp details under each manager

d. Display the average monthly salary bill for each deptno.

e. Show the average salary for all departments employing more than two people.

f. By using the group by clause, display the eid who belongs to deptno 05 along with average salary.

11. a. Count the number of employees in department20

b. Find the minimum salary earned by clerk.

c. Find minimum, maximum, average salary of all employees.

d. List the minimum and maximum salaries for each jobtype.

e. List the employee names in descending order.

f. List the employee id, names in ascending order by empid.

g. Delete any three records in the department table and use rollback.

h. Add constraint primary key and foreign key to the table.

12. a. Create a user and grant all permissions to the user.

b. Use revoke command to remove user permissions.

c. Change password of the user created.

d. Add constraint foreign key and not null.

13. a. Create a user and grant all permissions to the user.

b. Update the table reserves and use save point and rollback.

c. Add constraint primary key, foreign key and not null to the reserves table

d. Delete constraint not null to the table column.

Part B:

PROGRAMS ON PL/SQL

1. a. Write a PL/SQL program to swap two numbers.

   b. Write a PL/SQL program to find the largest of three numbers.

2. a. Write a PL/SQL program to find the total and average of 6 subjects and display the grade.

   b. Write a PL/SQL program to find the sum of digits in a given number.

3. a. Write a PL/SQL program to display the number in reverse order.

   b. Write a PL / SQL program to check whether the given number is prime or not.

4. a. Write a PL/SQL program to find the factorial of a given number.

   b. Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 3 to 7. Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns radius and area.

5. a. Write a PL/SQL program to accept a string and remove the vowels from the string.

   (When „hello"passedtotheprogramitshoulddisplay„Hll"removingeandofromt he world Hello).

   b. Write a PL/SQL program to accept a number and a divisor. Make sure the divisor is less than or equal to 10. Else display an error message. Otherwise Display the remainder in words.

PROCEDURES AND FUNCTIONS

1. Write a function to accept employee number as parameter and return Basic +HRA together as single column.
2. Accept year as parameter and write a Function to return the total net salary spent for a given year.
3. Create a function to find the factorial of a given number and hence find NCR.
4. Write a PL/SQL block o pint prime Fibonacci series using local functions. Create function to the reverse of given number.

CURSORS

1. Write a PL/SQL block that will display the name, dept no, salary of fist highest paid employees.
2. Write a PL/SQL block that will display the employee details along with salary using cursors.
3. To write a Cursor to display the list of employees who are working as a Managers or Analyst.
4. To write a Cursor to find employee with given job and deptno.
5. Write a PL/SQL block using implicit cursor that will display message, the salaries of all the employees in the „employee" table are updated. If none of the employee's salary are updated we get a message 'None of the salaries were updated'. Else we get a message like for example, 'Salaries for 1000employees are updated' if thereare1000rowsin„employee"table.

Note: Student has to execute a minimum of 10 programs in each part to complete the Lab course

Year	II	Course Code: 21BCA3C8P		Credits	02
Sem.	III	Course Title: Lab: C# and Dot NET Framework		Hours	52
Formative Assessment Marks: 25		Summative Assessment Marks:25		Duration of ESA: 03 hrs.	

Part A:

1. Develop a C# .NET console application to demonstrate the conditional statements.
2. Develop a C# .NET console application to demonstrate the control statements.
3. Develop an application in C#.NET that demonstrates the windows controls
4. Demonstrate Multithreaded Programming inC#.NET
5. Demonstrate subroutines and functions inC#.NET
6. Develop an application for deploying various built-in functions inC#.NET
7. Develop an MDI application for Employee Pay-roll transactions inC#.NET
8. Construct a console application to demonstrate the OOP Concepts
9. Develop a web application in C#.NET for dynamic Login Processing
10. Develop a Windows application with database connectivity for core-banking transactions.
11. Develop a program to sorting an one dimensional array by accepting 5 elements form user and arrange them in ascending order
12. Develop a program to perform sum of two compatible matrix of 2 dimensional array

Part B:

1 Write a program in C# to demonstrate abstract class and abstract methods in C#
2 Develop a program to perform Single level inheritance inC#.NET
3 Develop a program to perform Switch statements to display percentage of a student.
4 Write a program in C# to find the sum of each rows of a given jagged array of 3 inner arrays
5 Write a program to perform Timer Control Properties Start(),Stop().
6 Write a program in C# to create implement a delegate for any two arithmetic operations.

7 Design am application to implement various string operations such as reversing, case conversion, length, and concatenation.

8 Write a program in C# to demonstrate
  i)Boxing and unboxing
  ii) invalid unboxing

9 Write a program to demonstrate use of virtual and override key words in C#.

10 Develop the suitable content pages for the above created 4 hyperlinks with the following details:
  1. Enter New Area Details
  2. Enter New Postman Details with the Area he/she is in-charge of (display Area in a Combo box)
  3. Enter all the Letters distributed to the selected Area (display Area in a Combo box)
  4. Display all the Letter addresses (In a Grid) to be distributed by the selected Postman (In a Combo box)

11. Consider the Database db_EMS (Employee Management System)
consisting of the following tables:
  tbl_Designations (IdDesignation: int, Designation: string)
  tbl Employee Details(IdEmployee: int, EmployeeName: string, Contact Number: string, IdDesignation: int, IdReportingTo:int)
Develop a suitable window application using C#.NET having following options.
  1. Enter new Employee details with designation & Reporting Manager.
  2. Display all the Project Leaders (In a Grid) reporting to selected Project Managers (In a Combo box).
  3. . Display all the Engineers (In a Grid) reporting to selected Project Leader (In a Combo box).
  4. . Display all the Employees (In a Grid) with their reporting Manager (No Value for PM).

NOTE: tbl_Designation is a static table containing the following Rows in it.
1 Project Manager
2 Project Leader
3 Engineer

12.Write a program to demonstrate Web Applications with Web Forms. C#.NET

Note: Student has to execute a minimum of 10 programs in each part to complete the Lab course

Evaluation Scheme for Lab Examination:

Assessment Criteria		Marks
Program – 1 from Part A	Writing the Program	03
	Execution and Formatting	07
Program -2 from Part B	Writing the Program	03
	Execution and Formatting	07
Viva Voice based on Python Programming and Practical Record		10
Total		30

ELECTRONIC COMMERCE: OEC3

Course Title: E-Commerce	Course Credits: 3 (3L+0T+0P)
Semester: III	Duration of SEE: 02 Hour
Total Contact Hours: 42	SEE: 60 Marks
	IA: 40 Marks

Course Outcomes:
* Compare how internet and other information technologies support business processes.
* Demonstrate an overall perspective of the importance of application of internet technologies in business administration
* Explain the basic business management concepts.
* Demonstrate the basic technical concepts relating to E-Commerce.
* Identify the security issues, threats and challenges of E-Commerce.

UNIT I   Introduction to E-Commerce and Technology Infrastructure   14 Hrs

Working of Web - HTML Markup for Structure - Creating simple page - Marking up text - Adding Links - Adding Images - Table Markup - Forms - HTML5.

Building an E-Commerce Website, Mobile Site and Apps

Systematic approach to build an E-Commerce: Planning, System Analysis, System Design, Building the system, Testing the system, Implementation and Maintenance — Choosing hardware and software — Developing a Mobile Website and Mobile App

UNIT II   E-Commerce Security and Payment Systems   14 Hrs

E-Commerce Security Environment — Security threats in E-Commerce — Technology Solutions: Encryption, Securing Channels of Communication, Protecting Networks, Protecting Servers and Clients —Business Procedure and Public Laws- Payment Systems

UNIT III Business Concepts in E-Commerce   14 Hrs

Digital Commerce Marketing and Advertising strategies and tools — Internet Marketing Technologies — Social Marketing — Mobile Marketing — Location based Marketing — Ethical, Social.

Project Case Study

Case Study: Identify Key components, strategy, B2B, B2C Models of E-commerce Business model of any e-commerce website - Mini Project: Develop E-Commerce project in any one of Platforms like Woo-Commerce, Magento or Open cart.

TEXT BOOK:
1. Kenneth C.Laudon, Carol Guercio Traver —E-Commerce‖, Pearson, 10th Edition, 2016
REFERENCES:
1. http://docs.opencart.com/
2. http://devdocs.magento.com/
3. http://doc.prestashop.com/display/PS15/Developer+tutorials
4. Robbert Ravensbergen,—BuildingE-CommerceSolutionswithWoo Commerce‖,PACKT, 2nd Edition

Skill Enhancement Course: SEC2

Course Title: **Open Source Tools**	Course Credits: 2 (1L+0T+2P)
Semester: III	Duration of SEE: 01 Hour
Total Contact Hours: 13 hours of theory and 26-28 hours of practical's	SEE: 30 Marks IA: 20 Marks

Course Outcomes:

- Recognize the benefits and features of Open Source Technology and to interpret, contrast and compare open source products among themselves
- Use appropriate open source tools based on the nature of the problem
- Write code and compile different open-source software.

Course Content (Open Source Tools)

Module	Details of topic	Duration
Module 1: **Open Source** **Softwares**	i. Introduction to Open sources, Need of Open Sources, Open Source –Principles, Standard Requirements, Advantages of Open Sources– ii. Free Software –FOSS iii. Licenses – GPL, LGPL, Copyrights, Patents, Contracts & Licenses and Related Issues iv. Application of Open Sources. Open Source Operating Systems : FEDORA,UBUNTU	05 hours
Module 2: **Programming** **Tools And** **Techniques**	i. Usage of design Tools like Argo UML or equivalent ii. Version Control Systems like Git or equivalent iii. Bug Tracking Systems (Trac,BugZilla) iv. Boot Strap	04 hours
Module 3: **Case Studies**	i. Apache ii. Berkeley Software Distribution iii. Mozilla(Firefox) iv. Wikipedia v. Joomla vi. GNU Compiler Collection vii. LibreOffice	04 hours

TEXT BOOK:

1. Kailash Vadera, Bhavyesh Gandhi, "Open Source Technology", Laxmi Publications Pvt Ltd 2012, 1st Edition.

REFERENCE BOOK:

1. Fadi P. Deek and James A. M. McHugh, "Open Source: Technology and Policy", Cambridge Universities Press2007.

Course Content for BCA, Semesters IV

Semester: IV

Course Title: Python Programming	Course code: 21BCA4C10L
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (CO's):

At the end of the course, students will be able to:
* Explain the basic concepts of Python Programming.
* Demonstrate proficiency in the handling of loops and creation of functions.
* Identify the methods to create and manipulate lists, tuples and dictionaries.
* Discover the commonly used operations involving file handling.
* Interpret the concepts of Object-Oriented Programming as used in Python.
* Develop the emerging applications of relevant fields using Python.

DSC10: Python Programming

Unit	Description	Hours
1	**Introduction** to Features and Applications of Python; Python Versions; Installation of Python; Python Command Line mode; Simple Python Program. **Python Basics:** Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples. **Python Control Flow:** Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range () and exit () functions. **Exception Handling:** Types of Errors; Exceptions; Exception Handling using try, except and finally. **Python Functions:** Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Recursive Functions; Scope and Lifetime of Variables in Functions. **Strings:** Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods.	14

2	**Lists:** Creating Lists; Operations on Lists; Built-in Functions on Lists; Implementation of Stacks and Queues using Lists; Nested Lists. **Dictionaries:** Creating Dictionaries; Operations on Dictionaries; Built-in Functions on Dictionaries; Dictionary Methods; Populating and Traversing Dictionaries. **File Handling:** File Types; Operations on Files– Create, Open, Read, and Write, Close Files; File Names and Paths; Format Operator. **Object Oriented Programming:** Classes and Objects; Creating Classes and Objects; Constructor Method; Classes with Multiple Objects; Objects as Arguments; Objects as Return Values; Inheritance- Single and Multiple Inheritance, Multilevel and Multipath Inheritance; Encapsulation- Definition, Private Instance Variables; Polymorphism- Definition, Operator Overloading	14
3	**GU Interface:** The tkinter Module; Window and Widgets; Layout Management- pack, grid and place. **Python SQLite:** The SQLite3 module; SQLite Methods- connect, cursor, execute, close; Connect to Database; Create Table; Operations on Tables- Insert, Select, Update. Delete and Drop Records. **Data Analysis:** NumPy- Introduction to NumPy, Array Creation using NumPy, Operations on Arrays; Pandas- Introduction to Pandas, Series and Data Frames, Creating Data Frames from Excel Sheet and .csv file, Dictionary and Tuples. Operations on Data Frames. **Data Visualisation:** Introduction to Data Visualisation; Matplotlib Library; Different Types of Charts using Pyplot- Line chart, Bar chart and Histogram and Pie chart.	14

References:
1. Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2nd Edition, Green Tea Press. Freely available online @https://www.greenteapress.com/thinkpython/thinkCSpy.pdf,2015.
2. Introduction to Python Programming, Gowri shankar S et al., CRC Press,2019.
3. Python Data Analytics: Data Analysis and Science Using Pandas, matplotlib, and the Python Programming Language, Fabio Nelli, Apress®,2015
4. Advance Core Python Programming, Meenu Kohli, BPB Publications,2021.
5. Core PYTHON Applications Programming, Wesley J. Chun, 3rd Edition, Prentice Hall 2012.
6. Automate the Boring Stuff, Al Sweigart, No Starch Press, Inc,2015.
7. Data Structures and Program Design Using Python, D Malhotra et al., Mercury Learning and Information LLC,2021.
8. http://www.ibiblio.org/g2swap/byteofpython/read/
9. https://docs.python.org/3/tutorial/index.html

Course Title: Computer Multimedia & Animation	Course code: 21BCA4C11L
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (CO's):

At the end of the course, students will be able to:

* Write a well-designed, interactive Web site with respect to current standards and practices
* Demonstrate in-depth knowledge of an industry-standard multimedia development tool and its associated scripting language
* Determine the appropriate use of interactive versus standalone Web applications

DSC11: Computer Multimedia & Animation

Unit	Description	Hours
1	**Web Design:** Origins and evolution of HTML, Basic syntax, Basic text markup, Images, Lists, Tables, Forms, Frame, Overview and features of HTML5. CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The <span> and <div> tags; Overview and features of CSS3. JavaScript: Object orientation and JavaScript; General syntactic characteristics; Primitives, operations, and expressions; Screen output and keyboard input. **Animation:** What is an Animation? The Start and End States, Interpolation, Animations in HTML. All About CSS Animations, Creating a Simple Animation, Detailed Look at the CSS Animation Property, Key frames, Declaring Multiple Animations, Wrap-up. All About CSS Transitions, Adding a Transition, Looking at Transitions in Detail, The Longhand Properties, Longhand Properties vs. Shorthand Properties, Working with Multiple Transitions.	14
2	**HTML5 – SVG:** Viewing SVG Files, Embedding SVG in HTML5, HTML5 – SVG Circle, HTML5 – SVG Rectangle, HTML5 – SVG Line, HTML5 – SVG Ellipse, HTML5 – SVG Polygon, HTML5 – SVG Polyline, HTML5 – SVG Gradients, HTML5 – SVG Star. **HTML5 – CANVAS:** The Rendering Context, Browser Support, HTML5 Canvas Examples, Canvas - Drawing Rectangles, Canvas - Drawing Paths, Canvas - Drawing Lines, Canvas - Drawing Bezier Curves, Canvas - Drawing Quadratic Curves, Canvas - Using Images, Canvas - Create Gradients,	14
3	**HTML5 - Styles and Colors,** Canvas - Text and Fonts, Canvas - Pattern and Shadow, Canvas - Save and Restore States, Canvas - Translation, Canvas - Rotation, Canvas - Scaling, Canvas - Transforms, HTML5 Canvas - Composition, Canvas –Animations.	14

References:
1. The Complete Reference HTML and CSS, Fifth Edition, Thomas A Powell,2017.
2. Animation in HTML, CSS, and JavaScript By Kirupa Chinnathambi, 1st Ed, Create space Independent Pub,2013.
3. https://www.w3.org/Style/CSS/current-work#CSS3
4. http://bedford-computing.co.uk/learning/cascading-style-sheets-css/

Course Title: Operating System Concepts	Course code: 21BCA4C12L
Total Contact Hours: 42	Course Credits: 03
Formative Assessment Marks: 40	Duration of SEE/Exam: 02 Hours
Summative Assessment Marks: 60	

Course Outcomes (CO's):

At the end of the course, students will be able to:

- Explain the fundamentals of the operating system.
- Comprehend multithreaded programming, process management, process synchronization, memory management and storage management.
- Compare the performance of Scheduling Algorithms
- Identify the features of I/O and File handling methods.

DSC12: Operating System Concepts

Unit	Description	Hours
1	**Introduction to Operating System:** Definition, History and Examples of Operating System; Computer System organization; Types of Operating Systems; Functions of Operating System; Systems Calls; Operating System Structure. **Process Management:** Process Concept- Process Definition, Process State, Process Control Block, Threads; Process scheduling- Multiprogramming, Scheduling Queues, CPU Scheduling, Context Switch; Operations on Processes- Creation and Termination of Processes; Inter process communication (IPC)- Definition and Need for Inter process Communication; IPC Implementation Methods- Shared Memory and Message Passing; **Multithreaded Programming:** Introduction to Threads; Types of Threads; Multithreading- Definition, Advantages; Multithreading Models; Thread Libraries; Threading Issues.	14
2	**CPU Scheduling:** Basic concepts; Scheduling Criteria; Scheduling Algorithms; Multiple-processor scheduling; Real-Time CPU Scheduling. **Process Synchronization:** Introduction; Race Condition; Critical Section Problem and Peterson's Solution; Synchronization Hardware, Semaphores; Classic Problems of Synchronization- Readers and Writers Problem. **Deadlocks:** System Model; Deadlocks Characterization; Methods for Handling Deadlocks; Deadlock Prevention; Deadlock Avoidance; Deadlock Detection and Recovery from Deadlock. **Memory Management:** Logical and Physical Address Space; Swapping; Contiguous Allocation; Paging; Segmentation; Segmentation with Paging.	14

| 3 | **Virtual Memory:** Introduction to Virtual Memory; Demand Paging; Page Replacement; Page Replacement Algorithms; Allocation of frames, Thrashing. **File System:** File Concepts- Attributes, Operations and Types of Files; File System; File Access methods; Directory Structure; Protection; File System Implementation- File System Structure, Allocation Methods, Free Space Management Secondary Storage Structure, Protection. | 14 |

References:

1. Operating System Concepts, Silberschatz' et al.,10[th]Edition, Wiley,2018.
2. Operating System Concepts - Engineering Handbook, Ghosh PK,2019
3. Understanding Operating Systems, McHoes A et al.,7th Edition, Cengage Learning, 2014.
4. Operating Systems - Internals and Design Principles, William Stallings, 9th Edition, Pearson
5. Operating Systems – A Concept Based Approach, Dhamdhere, 3rd Edition, McGraw Hill EducationIndia
6. Modern Operating Systems, Andrew S Tanenbaum, 4th Edition.Pearson.

Year	II	Course Code: 21BCA4C10P		Credits	02
Sem.	IV	Course Title: Lab: Python Programming		Hours	52
Formative Assessment Marks: 25		Summative Assessment Marks: 25		Duration of ESA: 03 hrs.	

Part-A
1. Program to check if a number belongs to the Fibonacci Sequence
2. Program to solve Quadratic Equations
3. Program to find the sum of n natural numbers
4. Program to display Multiplication Tables
5. Program to check if a given number is a Prime Number or not
6. Program to implement a sequential search
7. Program to create a calculator program
8. Program to explore string functions
9. Program to implement Selection Sort
10. Program to implement Stack
11. Program to Read and write into a file
12. Program to check the given number is palindrome or not.

Part-B
1. Program to demonstrate usage of basic regular expression
2. Program to demonstrate use of advanced regular expressions for data validation.
3. Program to demonstrate use of List
4. Program to demonstrate use of Dictionaries
5. Program to create SQLite Database and Perform Operations on Tables
6. Program to create a GUI using Tkinter module
7. Program to demonstrate Exceptions in Python
8. Program to Drawing Line chart and Bar chart using Matplotlib
9. Program to Drawing Histogram and Pie chart using Matplotlib
10. Create Array using NumPy and Perform Operations on Array
11. Create Data Framefrom Excel sheet using Pandas and Perform Operations on Data Frames
12. Demonstrate inorder, preorder and post order traversal.

Note: A minimum of 10 Programs should be done in each Part.

Year	II	Course Code: 21BCA4C11P		Credits	02
Sem.	IV	Course Title: Lab: Multimedia and Animation		Hours	52
Formative Assessment Marks: 25		Summative Assessment Marks: 25		Duration of ESA: 03 hrs.	

Part A:

1. Develop and demonstrate a HTML5 document that illustrates the use external style sheet, ordered list, table, borders, padding, color and the tag.

2. Develop and demonstrate a HTML5 file that includes JavaScript for the following problem:

Input : A number N obtained using prompt

Output : The first N Fibonacci numbers

3. Write a HTML5 program to draw circle using SVG.

4. Write a HTML5 program to draw rectangle using SVG

5. Write a HTML5 program to draw line using SVG.

6. Write a HTML5 program to draw ellipse using SVG.

7. Write a HTML5 program to draw polygon using SVG.

8. Write a HTML5 program to draw polyline using SVG.

9. Write a HTML5 program to draw gradient ellipse using SVG.

10. Write a HTML5 program to draw Star using SVG.

11. Write a HTML5 program to draw Line using Canvas.
12. Write a HTML5 program to draw rectangle using Canvas.

Part B:

1. Write a HTML5 program to draw a triangle using Canvas.

2. Write a HTML5 program to draw Quadratic curves using Canvas.

3. Write a HTML5 program to draw Images using Canvas.

4. Write a HTML5 program to create **Linear** Gradient using Canvas.

5. Write a HTML5 program to create **Rainbow gradient using Canvas.**

6. Write a HTML5 program to create Radial gradient.

7. Write a HTML5 program to draw text using Canvas.

8. Write a HTML5 program to draw Rotation of rectangle using Canvas.

9. Write a HTML5 program to draw a rectangle, scale to 200%, draw rectangle again, scale to 200%, draw rectangle again, scale to 200%, draw rectangle again using Canvas.

10. Write a HTML5 program to draw Animation using Canvas.

11. Write a HTML5 program to draw a rectangle, add a new transformation matrix with transform(), draw the rectangle again, add a new transformation matrix, then draw the rectangle again. Notice that each time you call transform(), it builds on the previous transformation matrix.

12. Write a HTML5 program to draw a rectangle in position (10,10), set new (0,0) position to (70,70). Draw same rectangle again (notice that the rectangle now starts in position (80,80).

Note: Student has to execute a minimum of 10 programs in each part to complete the Lab course

Course Title: Python Programming Concepts	Course Credits: 3 (3L+0T+0P)
Semester: IV	Duration of SEE: 02 Hour
Total Contact Hours: 42	SEE: 60 Marks IA: 40 Marks

Course Outcomes:

- Explain the fundamentals of Computers.
- Explain the basic concepts of Python Programming.
- Demonstrate proficiency in the handling of loops and the creation of functions.
- Identify the methods to create and store strings.

UNIT I   Python Basics   14 Hrs

Computer Languages - Machine Level, Assembly Level & High Level Languages, Translator Programs Assembler, Interpreter and Compiler; Planning a Computer Program - Algorithm, Flowchart and Pseudo code with Examples.

Introduction to Features and Applications of Python; Python Versions; Installation of Python; Python Command Line mode Simple Python Program, Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples; Illustrative programs.

UNIT II   14 Hrs

Python Control Flow: Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range() and exit () functions; Illustrative programs.

Python Functions: Types of Functions; Function Definition- Syntax, Function Calling. Passing Parameters/arguments, the return statement; Default Parameters; Illustrative programs.

UNIT III   14 Hrs

Strings: Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods; Illustrative programs.

Python Classes: Thinking about Objects, Class Variables and Methods, Managing Class Files

REFERENCES
1. Computer Fundamentals (BPB), P. K.Sinha & Priti Sinha
2. Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2nd

Edition, Green Tea Press. Freely available online 2015.
@https://www.greenteapress.com/thinkpython/thinkCSpy.pdf

3. Introduction to Python Programming, Gowri shankar S et al., CRC Press,2019.
4. http://www.ibiblio.org/g2swap/byteofpython/read/
5. http://scipy-lectures.org/intro/language/python_language.html
6. https://docs.python.org/3/tutorial/index.html

BOS Chairman
Dept. of Computer Science
Davangere University
Shivagangotri, Davangere